EVOLUTION

INTERNATIONAL JOURNAL OF ORGANIC EVOLUTION

ZOOLOGY - BOTANY
LIBRARY
COLUMBIA UNIVERSITY

Volume X, 1956

Published Quarterly

At Prince and Lemon Streets, Lancaster, Pa.

By the

Society for the Study of Evolution

MAY 6 1957

TABLE OF CONTENTS

Number 1, March

Genetic Assimilation of the *Bithorax* Phenotype. C. H. Waddington 1
Selection for Sexual Isolation Within a Species. G. R. Knight, Alan Robertson, and C. H. Waddington 14
Pollen Dimorphism in the Rubiaceae. H. G. Baker 23
Population Variability, Hybridization, and Introgression in Some Species of *Ophrys*. G. Ledyard Stebbins and L. Ferlan 32
Serological Light on Porcupine Relationships. Paul A. Moody and David E. Doniger 47
The Origin and Evolution of the Venomous Snakes. Ralph G. Johnson ... 56
A Further Report on the Genetics of the Machaon Group of Swallowtail Butterflies. C. A. Clarke and P. M. Sheppard 66
Evolution of Some Endocarpal Features in the Tribe Tinosporeae (Menispermaceae). Richard A. Scott 74
Genetics of Natural Populations. XXV. Genetic Changes in Populations of *Drosophila pseudoobscura* and *Drosophila persimilis* in Some Localities in California. Th. Dobshzansky 82
Semilethal Complementary Factors in a Tomato Species Hybrid. Anand C. Sawant 93

Notes and Comments

Catastrophism and the Fossil Record. Norman D. Newell 97
Adaptation of Man to Cold Climates. Marshall T. Newman 101
Geographical Character Gradients and Climatic Adaptation. Ernst Mayr 105

Number 2, June

Evidence of Vascular Plants in the Cambrian. S. LeClercq 109
The Genetics and Evolution of Gynodioecy. D. Lewis and Leslie K. Crowe 115
The Origin of *Clarkia lingulata*. Harlan Lewis and Margaret R. Roberts 126
Fecundity of Hybrids Between Geographic Populations of *Drosophila pseudoobscura*. M. Vetukhiv 139
An Analysis of Variation in a Variable Population of *Cladonia*. Edgar Anderson and E. D. Rudolph 147
The Geographic History of *Quercus ajoensis*. John M. Tucker and Cornelius H. Muller 157
Comparison of the Block Island "Species" of *Microtus* with *M. pennsylvanicus*. Bernice Wheeler 176
Evolution of the Loop and Lophophore in Terebratuloid Brachiopods. Francis G. Stehli 187
Evolution in the Subholostean Fishes. Bobb Schaeffer 201
Reproductive Organ Polymorphism in Earthworms of the Oriental Megascolecine Genus *Pheretima* Kinberg 1867. G. E. Gates 213

Notes and Comments

Schistic Evolution. Hobart M. Smith 228

NUMBER 3, SEPTEMBER

Differential Viability Favoring Inversion Heterozygotes in *Drosophila willistoni*. A. BRITO DA CUNHA 231
Taxonomy and the Evolution of Genera, with Special Reference to the Family Gramineae. G. LEDYARD STEBBINS 235
Introgression in Planktonic Rotatoria with Some Points of View on Its Causes and Conceivable Results. BIRGER PEJLER 246
Ecologic Factors that Accelerate Formation of Races and Species of Terrestrial Vertebrates. ALDEN H. MILLER 262
A Model of a Genetic System Which Leads to Closer Linkage by Natural Selection. MOTOO KIMURA 278
Chromosomal Polymorphism and Sexual Isolation in Sibling Species of the Bocainensis Subgroup of *Drosophila*. FRANCISCO M. SALZANO ... 288
Adaptive Chromosomal Polymorphism in an Australian Grasshopper. M. J. D. WHITE 298
A Biometric Study of the Evolution of Fissipede Carnivores. M. CRUSAFONT-PAIRÓ and J. TRUYOLS-SANTONJA 314
Notes and Comments
Symposium on Evolution Held in Spain. G. G. SIMPSON 333
The Palaeobotanist. SUZANNE LE CLERCQ 334
Genetic Assimilation: Adaptation Versus Adaptability. FREDERICK E. WARBURTON 337
Climatic Rules. P. F. SCHOLANDER 339
Correction
H. G. BAKER . . . Dimorphism in the *Rubiacea*. EVOLUTION, Vol. X, No. L, Fig. 2 (1956) 340

NUMBER 4, DECEMBER

Interfertility Between Two Sympatric Fishes. *Notropis lutrensis* and *Notropis venustus*. CLARK HUBBS and KIRK STRAWN 341
On the Evolution of Parthenogenesis in Lonchoptera (Diptera). HARRISON D. STALKER 345
Re-examination of the Diversity in *Partula taeniata*. DONALD W. BAILEY ... 360
Gene Frequency in Small Populations of Mutant Drosophila. PETER BURI ... 367
A Genetic Approach to the Systematics of Planorbid Molluscs. W. LOBATO PARAENSE 403
Additional Observations on Chromosomal Translocations in Cotton Hybrids. D. U. GERSTEL and PATRICIA A. SARVELLA 408
Interspecific Hybrids in New Zealand *Agropyron*. H. E. CONNOR 415
A Gene Mutation Which Changes a Behavior Pattern. MARGARET BASTOCK 421
Notes and Comments
Further Comments on the Origin of the Tetrapods. COLEMAN J. GOIN and OLIVE B. GOIN 440

INDEX TO VOLUME X, 1956

adaptation, man to cold climates, 101–104; versus adaptability, 337–339
Agropyron, 415–420; biosystematic analysis, 417 (tbl.); crossing pattern, 418 (fig.); fertility of hybrids, 415–417; lodicules and caryopses, 239 (fig.)
albino mutants, planorbid molluses, 403–407
Anderson, E., 147–156
assimilation, genetic, 1–13
association of characters, 205–209
Australorbis glabratus, nigricaus, centimetralis, janeireusis, 403–407
Bailey, D. W., 360–366
Baker, H. G., 23–31
Baldwin, J. M., 10
Bastock, M., 421–439
behavior, pattern change by mutation, 421–439
biometric study, le Evolution fissipede carnivores, 314–332
Bithorax phenotype, 1–13
brachiopods, terebratuloid, 187–200, relationships, 199 (fig.)
Buri, P., 367–402
butterflies, 66–73
Canidae, 314–332 (figs.)
catastrophism, 97–101
Caturus, 203 (fig.)
Chandlera lacunosa, endocarp, 75 (fig.)
character gradients, geographical, 105–108
Chimaeras, in *Origanum vulgare,* 121
Chlaenandra, endocarp, 75, (fig.)
chromosomal, inversions, rarity, causes, spread in natural populations, 90–91; polymorphism, 288–297, adaptive in Australian grasshopper, 298–313; translocations, cotton-hybrids, 408–414
chromosomes, *Clarkia lingulata,* 129; *Lonchoptera dubia,* 346–355
Cladonia, analysis of variation, 147–156
Clarke, C. A., 66–73
Clarkia, biloba, geographical distribution, 127 (fig.); *lingulata,* chromosomal studies, 126–138, geographical distribution, 127 (fig.), origin, 126–138.
climatic rules, 339–340
complementary factors, semilethal, 93–96
Connor, H. E., 415–420
Conochilus hippocrepis, unicornis, 252, 253 (figs.)
cotton, hybrids, chromosomal translocations, 408–414
courtship, *Drosophila melanogaster,* 423–424
Cranaena, loop ontogony, 191 (fig.)
crosses, conspecific allopatric populations, 403–404
Crotalidae, 56–65
Crowe, L. K., 115–125
Crusafont-Pairo, M., 314–332
cycles, numbers of individuals, terrestrial vertebrates, 262–263, 276
da Cunha, A. B., 231–235
Dallina septigera, metamorphism of loop, 190 (fig.)
Dipodomys, ranges of species, 273 (fig.)
Diptera, Lonchoptera, 345–359
dimorphism, pollen in Rubiaceae, 23–31
Dobzhansky, Th., 82–92
Doniger, D. E., 47–55
Drosophila, bocainensis subgroup, 288–297, frequency, 289 (tbl.); *melanogaster,* behavior patterns, 421–439, courtship, 423–427, gene frequency in small populations, 367–402, gene mutation, 421–439, genetic assimilation, 1–12, mutant strains, 15, sexual isolation, 423–427; parthonogenetic, 356–357; *persimilis,* 82–92, seasonal changes, 84–86; *pseudoobscura,* fecundity of hybrids, 139–146, seasonal changes, 82–84, yearly changes, 86–88, random drift experiments, 347–349, 368–369, 377–380; selection experiments, 369–377, 399–400; sexual isolation, 14–22; *willistoni,* inversion heterozygotes, 231–234
earthworms, 213–227
ecological factors, in formation of races and species, 262–277
Elapidae, 56–65
Elymus, lodicules and caryopses, 239 (fig.)
endocarpal features, Tinosporeae, 74–81
Erethizon, 47–55
evolution, endocarpal features in Tinosporeae, 74–81; fissipede carnivores, 314–332; genera, 235–245; gynodioecy, 115–125; mosaic, 201, loop and lophophore, terebratuloids, 187–200; schistic, 228–229; subholostean fishes, 201–211; symposium in Spain, 333–334; venomous snakes, 56–65
Faramea, flower morphology, 26–27; pollen, dimorphism, 25–26 (fig.), morphology, 26–27
fecundity, hybrids, 139–146
Felidae, 314–332 (figs.)
Ferlan, L., 32–45
Festuca, lodicules and caryopses, 235–237 (fig.)
fissipeds, evolution of, 314–332
fossil record, and catastrophism, 97–101
Gates, G. E., 213–227
gene, frequency, small population *Drosophila,* 367–402; mutation, and behavior pattern, 421–439, evolutionary implications, 435–438
genera, evolution of, 235–245
genetic, assimilation, 337–339, bithorax, 1–13; system, model of, 278–287
genetics, gynodioecy, 115–125; populations of *Drosophila,* 82–89; *machaon* group of butterflies, 66–73
geographical character gradients, 105–108
Gerstel, D. N., 408–414

Glaucolepis, 203– (fig.)
Goin, C. J. and O. B., 440–441
Gossypium, 408–414; *barbadense,* chromosomes, 419 (fig.)
gradient, geographical characters, 105–108
Gramineae, 235–245
grasshopper, Australian, 298–313
gynodioecy, genetics and evolution, 115–125
heterozygosis, proportions in *Drosophila melanogaster,* 394–397
higher categories, origin, 201
Hordeum, lodicules and caryopses, 239 (fig.)
Hubbs, Clark, 341–344
Hyaenidae, 314–332 (figs.)
hybrid, index in *Ophrys,* 39–40; tomato species, 93–96
hybridization, effect of floral biology, 42–43; interspecific in *Clarkia,* 129–134; *Ophrys,* 32–45
hybrids, cotton, 408–414; fecundity between geographic populations, 139–146; fertility, *Agropyron,* 415–417; *Gossypium,* 408–414; interspecific, *Agropyron,* 415–420; *Notropsis lutrensis* and *venustus,* 341–344
hystrix, 48–55
index of variation, *Cladonia,* 149–152
insular faunas, unbalance, 263
interfertility, sympatric fishes, 341–344
interspecific, crosses, planorbid molluses, 404–405; hybridization, *Clarkia,* 129–134; hybrids, *Agropyron,* 415–420
introgression, *Ophrys,* 32–45; planktonic Rotatoria, 246–261; recognition of, 147–156; sympatric, 257; terrestrial vertebrates, 267–268
inversion, frequency in natural populations of *Drosophila,* 291–292
Johnson, R. G., 56–65
Kimura, M., 278–287
Knight, G. R., 14–22
Leclercq, S., 109–114, 334–336
Lewis, D., 115–125
Lewis, H., 126–138
linkage, 278–287
Lolium, lodicules and caryopses, 237 (fig.)
Lonchoptera dubia, chromosomal variability, 355–357; chromosomes, description, 346–349 (fig.); geographical distribution, 359 (tbl.), 351 (map); parthenogonesis, 34–355
loop, brachiopods, 187–200
lophophore, brachiopods, 187–200
machaon group, 66–73
male viability, heterotic effect, 306–307
Mayr, E., 105–108, 339–340
Megascolecine earthworms, 213–227
Melospiza melodia, breeding ranges of races, California, 265 (fig.); ranges of races, 266 (fig.)
Mendocina brevis, 204 (fig.)
Menispermaceae, 74
Microtus, Block Island species, 176–186 (figs.); *pennsylvanicus,* 176–186; *provectus,* 176
Miller, A. H., 262–277
model, genetic system, 278–287
Moody, P. A., 47–55
Moraba scurra, cytology, 300–302 (fig.), 308–310 (fig.); distribution, ecology, life cycle, 300–302; natural populations, 302–306
Morgan, L., 10
mosaic evolution, 201
Muller, H. J., 14
Mustelidae, 314–332
mutation, and change in behavior, 431–439; in *Origanum vulgare,* 121
natural populations, genetics of, 82–92
natural selection, model of genetic system, 278–287
New Zealand, *Agropyron,* 415–420
Newell, N. D., 97–101
Newman, M. T., 101–104
Notropssis, 341–344
Odontocaryioidea, endocarps of species, 78 (fig.)
Ophrys, fusca, gauthieri, lutea, murbeckii, 34–38, 35 (fig.); hybrid index, 39–40; introgression, 39–42; origin of species, 43–45
Orchidaceae, 32–45
organic selection, 10
Origanum vulgare, 116–125
origin, of species, *Ophrys,* 43–45; of tetrapods, 440–441
Paleobotanist (rev.), 334–336
palynology, 11
Papillio, bairdi, 71; *hospiton,* 69, *machaon* 71, *polyxenesasterius,* 66
Parabaena, endocarps, 75 (fig.)
Paraense, W. L., 403–407
parallel evolution, rodents, 47
parathenogenesis, evolution, 345–359; origin in *Lonchoptera dubia,* 353–355; selection for in *Drosophila parthenogetica,* 356–357
Partula taeniata, 360–366, distribution map, 362, phylogenetic distances, 363 (fig., tbl.)
Passerella, breeding ranges, species and varieties, 264, 270–272 (figs.)
Pejler, B., 246–261
Pheretima, alexandri, 218–219, *anomala,* 215–218, *campanulata,* 219–222, *diffringeus,* 224–225, *elongata,* 224, *houlleti,* 222, *levis,* 222–224, *meridiana,* 222
phylogenetic distances, 363
planorbid molluses, 403–407; allopatric populations, 405–406; interspecific crosses, 404–405; selfing and crossing, 403
Plectolophus, 188 (fig.)
pollen dimorphism, Rubiaceae, 23–31, *Armeria,* 23, *Faramea,* 23–31 (figs.), *Limonium,* 23, *Rudgea jasminoides,* 27–29; Plumbaginaceae, 23
Polyarthra dolichoptera, vulgaris, 246, 247 (figs.), seasonal distribution, 251
polymorphism, reproductive organ, 213–227
population, variability, *Ophrys,* 32–45; levels in terrestrial vertebrates, 262–263
porcupine relationships, 47–55

Quercus, ajoensis, 157–175; ecology and geography of species, 157–159 (fig.); morphology, 159–161; paleontology, 171–173
races, formation of, 262–277
random drift, experiments on *Drosophila,* 368–369
Roberts, M. R., 126–138
Robertson, A., 14–22
Rotatoria, 246–261
Rubiaceae, pollen dimorphism, 23–31
Rudgea jasminoides, pollen, 27–29 (fig.)
Rudolph, E. D., 147–156
Salazano, F. M., 288–297
Sarvella, P. A., 408–414
Sawant, A. C., 93–96
Schaeffer, B., 201–211
schistic evolution, 228–229
Schizolophus, 188 (fig.)
Scholander, P. F., 101–104, 105–108, 334–340
Scott, R. A., 74–81
selection, for sexual isolation, 14–22
serology, 47–53
sex ratio, hybrid of *Papillio machaon hippocrates,* 67
sexual, isolation, selection for, 14–22, sibling species, 288–297, preferences, 19–20
Sheppard, P. M., 66–73
sibling species, *Drosophila bocainensis* group, 288–297
Simpson, G. G., 333–334
small populations, *Drosophila,* 367–402
Smith, H., 228–229
snake vertebrae, phylogenetic significance, 56–65
species, formation of, 262–277
spores, early Paleozoic, 109
Stalker, H. D., 345–359
Stebbins, G. L., 32–45, 235–245
Stehli, F. G., 187–200
Strawn, K., 341–344
subholostean fishes, 201–211
sympatric fishes, interfertility, 341–344
symposium on evolution in Spain, 333–334
systematics, planorbid molluses, 403–407
Taxolophus, 188 (fig.)
taxonomy, evolution of genera, 235–245
terebratuloid brachiopods, 187–200
terrestrial vertebrates, formation of races and species, 262–277
tetrapods, origin of, 440–441
tomato, 93–96
Trocholophus, 188 (fig.)
Truyols-Santonja, J., 314–332
Underwood, G., 11
Ursidae, 314–332 (figs.)
viability, differential, 231–234
variability, chromosomal in *Lonchoptera,* 355–357
variation, *Cladonia,* 147–156
vascular plants, in Cambrian, 109–114
venomous snakes, evolution, 56–65; eyes, 62; jaw musculature, 62; head shields, 61–62; origin, 56–65; skull and dentition, 61; trunk musculature, 62; venom and venom glands, 61; vertebrae, 62
Vetukhiv, M., 139–146
Viperidae, 56–65
Viverridae, 314–332 (figs.)
Waddington, C. H., 1–13, 19–22
Warburton, F. E., 337–339
Wheeler, B., 176–186
Zugolophus, 188 (fig.)